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# Trends and correlates of post-retirement employment, 1977–2009

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**Abstract**
The stereotypical retirement experience – the abrupt ceasing of all paid work and commencement of a life of leisure – is the experience of only half of all workers. Yet, despite the prevalence of combining work and retirement in the US and the implications this work-retirement behavior may have for organizations and individual workers, post-retirement employment behavior is understudied. In this article, we add to the growing literature on retirement and late-life employment processes by examining the trends and correlates of post-retirement employment in the US from 1977 to 2009. We find a modest curvilinear trend in post-retirement employment for both males and females over the last 33 years. However, the modest upward trends in post-retirement employment obscure the countervailing influences of significant changes in behavior and in the macro-level demographic and economic forces that are significant determinants of post-retirement employment.

**Keywords**
retirement, post-retirement employment, older workers, aging and work, gender and employment, sociology, demography

## Introduction

Contrary to the common notion that retirement means an abrupt end to labor force participation, research shows that older workers in the US exit the workforce in complex ways (Hayward et al., 1994; Moen et al., 2000; Quinn and Kozy, 1996; Warner et al.,

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2010). Researchers argue that retirement is more of a process than an event (Marshall et al., 2001; Moen et al., 2000; Pleau, 2010), with dozens of possible combinations of paid work and time out of the labor force. Working for pay after defining oneself as retired is more common than generally assumed, and the stereotypical retirement experience – the abrupt ceasing of all paid work and commencement of a life of leisure – is the experience of only about half of all workers (Han and Moen, 1999; Maestas, 2010; Moen et al., 2000; Pleau, 2010; Ruhm, 1990).

Despite the prevalence of combining work and retirement in the US and the implications this work-retirement behavior may have for organizations and individual workers, post-retirement employment behavior is understudied. Understanding the work patterns of older Americans is important in light of changes in population demographics, shifting employment opportunity structures, and eroding personal, employer, and government safety nets. Examining factors associated with the timing and form of post-retirement employment can help employers and governments adjust to the demands of an aging population. Examining the *retirement-to-work* transition, or 'post-retirement employment,' will increase our understanding of the economic and social mechanisms that shape these labor market transitions. Differential rates of post-retirement employment may signal differences in opportunities or constraints across definable subpopulations.

In this article, we add to the literature on retirement and employment processes by examining the trends and correlates of post-retirement employment in the US from 1977 to 2009. Specifically, the article presents: 1) trends in the prevalence of post-retirement employment for the older population; and 2) an analysis of the correlates of post-retirement employment that might explain the observed trends.

## Post-retirement employment

Post-retirement employment is undertheorized but theoretical perspectives relevant to retirement might frame an examination of the retirement-to-work transition (see discussion in Wang and Schultz, 2010). Individual-level theories, such as rational choice theory, life course theory, role theory, and career models can help researchers understand how decision-making processes, timing, family effects, and workers' own efficacy impact the likelihood of post-retirement employment (e.g. Hall, 2004; Maestas, 2010; Pleau, 2010; Shultz and Wang, 2008). Organizational and human resource theories suggest how the use of benefits and phased retirement policies maximize organizational goals but also help shape older workers' employment transitions (Feldman, 2003; Shuey, 2004; Shultz, 2003). This article fills a gap in the theoretical understanding of retirement-to-work transitions by presenting an analysis of how macro-level contexts affect entry into post-retirement employment. In particular, we look at how macroeconomic and demographic changes have affected the trends in post-retirement employment since 1977.

Previous studies highlight the difficulty of defining and operationalizing both retirement and post-retirement employment (see discussions in Ekerdt and DeViney, 1990; Pleau, 2010). Ekerdt and DeViney (1990) outline five common ways to define a population as 'retired': separation from a career, exit from the labor force, reduced work hours, public or private pension receipt, or self-definition. Each can produce different results when analyzing rates and trends of labor force reentry. Longitudinal studies of

post-retirement employment using self-defined states of full- or partial-retirement suggest 30−50 percent of individuals experience post-retirement employment (Maestas, 2010; Pleau, 2010; Ruhm, 1990; Warner et al., 2010). The reported variation in post-retirement rates is owed primarily to the definition of 'retired,' which often results in differences in the composition of analytical samples. Maestas (2010) and Pleau (2010) use Health and Retirement Study (HRS) data and include in their samples only those individuals working at time *t* and self-reporting partial or full retirement at time *t*+1. This more limited sample allows analysis of behavior in the subsequent years immediately following self-identified 'retirement.' Warner et al. (2010), on the other hand, include in their sample all HRS participants who were not in the labor force at time *t*, which results in a lower rate of post-retirement employment and different results by gender.

In this study, we use an 'exit from the labor force' (Ekerdt and DeViney, 1990) definition of the 'retired' population that incorporates some important constraints. We include all individuals aged 50 or older, who have past labor force participation, and who are not in the labor force at the time they are observed in our sample. This definition will likely yield lower rates of post-retirement employment compared with the longitudinal studies cited above, as our relatively open definition will generate a sample of 'retirees' characterized by heterogeneity in labor force attachment and investment, retirement tenure, etc.

Previous research shows that the experience of post-retirement employment in the US differs by subpopulations (Chen and Scott, 2006; Clark and Ogawa, 1997; Cotter et al., 2002; Davis, 2003; Han and Moen, 1999; Hutchens, 2007; Maestas, 2010; Moen et al., 2000; Pleau, 2010; Quinn and Kozy, 1996; Quinn et al., 1990; Raymo et al., 2004; Ruhm, 1990; Singh and Verma, 2003; Warner et al., 2010). On average, those who are male, healthy, younger, educated, lacking a private pension, and who have shorter preretirement job tenure are more likely than others to work after self-defining as retired. And those who reenter the labor market after a spell of retirement usually work fewer hours, for lower pay, and in different industries and occupations than their pre-retirement jobs (Gauthier and Smeeding, 2003; Johnson and Kawachi, 2007). In addition, results from a rigorous cross-national study reveal differences in work patterns across countries that are likely caused by differences in macro-level factors that have not been well identified or tested (Gauthier and Smeeding, 2003).

Most studies on post-retirement employment conclude that women are less likely to reenter the labor force after self-identifying as retired (Maestas, 2010; Moen et al., 2000; Pleau, 2010; Singh and Verma; 2003). These studies show that women's odds of working in retirement are negatively associated with marriage, household wealth, and lower preretirement earnings, whereas these factors increase the odds of post-retirement employment for men (Pleau, 2010). Discrepancies between studies that examine gender differences [e.g. Ruhm (1990) and Warner et al. (2010) find that women have slightly higher rates of reentry] are likely explained by differences in the operationalization of the 'retired' population at risk of labor force reentry (see discussion in Pleau, 2010).

In sum, we know that individual characteristics of gender, health, age, education, pension, retirement tenure, marital status, wealth, and income affect the likelihood of post-retirement employment, but we do not know how macroeconomic and demographic shifts may have shaped rates of retiree labor force reentry.

## Macro influences on post-retirement employment

One study of trends in the labor force transitions of older workers showed that the rate of post-retirement employment was low and relatively stable from 1968 to 1989 (Peracchi and Welch, 1994). But as significant economic and demographic changes have occurred since the late 1980s, it is reasonable to question the continued stability of this trend.

### *Macroeconomic changes*

Public policy can shape employment behavior. Quinn (1999) shows that the long-term trend toward ever-earlier retirement for men has flattened out over the last 25 years. The author in part credits changes in rules for both Social Security and mandatory retirement for this reversal. First, Social Security rules have changed so that some recipients can earn additional income without losing benefits. For example, in 2000 the federal Senior Citizens Freedom to Work Act (SCFWA) eliminated the policy that enforced a reduction of Social Security benefits among those who continued to work past full retirement age, as defined by the Social Security Administration. Prior to 2000, Social Security benefits were reduced if earnings exceeded age-specific thresholds, so passage of the SCFWA may have removed a significant economic impediment to the continuation of work and/or labor force reentry among those aged 65 and older (Song and Manchester, 2006). Second, mandatory retirement was abolished with the 1967 Age Discrimination in Employment Act, which prohibits employment discrimination of workers aged 40 and older (US EEOC, 2011), and the prohibition was further strengthened by congressional actions in 1986 (Quinn, 1999). These changes in Social Security and mandatory retirement laws likely affected post-retirement employment by reducing the constraints for those who wanted or needed to work at older ages.

Over the past 20–30 years, the US labor force has experienced macroeconomic changes that are known to have influenced employment outcomes for the working population, and we hypothesize that these macroeconomic changes may likewise have influenced employment among the retired population. These macroeconomic trends include fluctuations in the unemployment rate; cycles of economic expansion and contraction, including the recent 'Great Recession'; declining worker access to defined benefit pensions; the declining share of industrial manufacturing jobs in the occupational structure; and an increase in nonstandard work arrangements, which shift risk from employers to employees (Shuey and O'Rand, 2004).

Contraction of the US manufacturing sector over the last 30 years means that workers in that industry face not only higher rates of layoff but a shrinking number of jobs that demand their skills and experience. The share of manufacturing jobs in the US labor market dropped from 27 percent in 1965 to 12 percent in 2005 (US Dept of Labor, 2008), so it is not surprising that those retiring from manufacturing jobs have relatively low odds of post-retirement employment (Pleau, 2010). In contrast, the service industry – a female dominated sector of the labor market – has expanded in recent years, up from 60 percent in 1965 to 79 percent of all jobs in 2005 (US Dept of Labor, 2008). The contraction of traditionally male-dominated manufacturing jobs and the expansion of traditionally female-dominated service jobs may generate gender differences in post-retirement employment opportunities.

Globalization and technological changes have reshaped the employee−employer relationship, increasing the prevalence of nonstandard work arrangements, including temporary and contract workers (Smith, 2001). These contingent work arrangements provide flexibility to employers in increasingly competitive business environments, but add to employee insecurity. Workers today face a riskier employment climate than they did 30 years ago (Kalleberg, 2009; Shuey and O'Rand, 2004), as the norms of long-term employment and rewards for employee loyalty have weakened. A salient indicator of the decline in employer commitment to workers is the trend away from defined benefit pension plans and toward defined contribution plans, a type of pension that shifts the risk of saving and managing retirement income from employer to employee. In 2004, only 11 percent of all workers were covered exclusively by defined benefit pension plans, compared with 60 percent in 1980 (Munnell and Perun, 2006).

Today's employment climate − with the contraction of manufacturing jobs, high rates of unemployment, and a riskier employment relationship − may have differential effects on retirement-age workers. On the one hand, 'discouraged' older workers may take up retirement when faced with job loss and disappointing employment opportunities.[1] Recent turmoil in the financial markets may force older workers to seek paid employment as their wealth and retirement incomes decline. On the other hand, older workers report a desire to reduce hours leading up to full retirement (Moen et al., 2000) and may prefer the more flexible, contingent jobs that are increasingly available in the labor market (Johnson and Kawachi, 2007).

## *Demographic changes*

Along with macroeconomic changes, the demographics of the population have also shifted over the last 30 years. The population as a whole is aging, improvements in health and health care have led to more years of active life, the representation of women has increased to about half of the total workforce, and the frontrunners of the Baby Boom generation (those born between 1946 and 1964) have reached the age at which they can receive Social Security income.[2]

The mean population age in most industrialized countries has risen steadily over the last 30 years. In the United States, those 65 and older represented 12 percent of the population in 2000 but are expected to represent 19 percent by 2030 and to double in size numerically (Federal Interagency Forum, 2010). Health improvements have contributed to lower mortality rates and greater life expectancy, which in turn increase the population representation of those aged 65 and older. The additional years of life tend to be active ones (Federal Interagency Forum, 2010) in spite of the fact that many older Americans manage chronic health conditions (US Dept Health & Human Services, 2010). The expansion of active years suggests that working during retirement is more possible and appealing today than in the past. In addition, the advancement of the Baby Boom generation into ages at which they could retire from careers or receive Social Security is expected to catalyze a cultural shift in the meaning and experience of retirement and the normative retirement-aged work and leisure behaviors (Gillon, 2004). As evidence of these expected normative and behavioral changes, recent studies report that 77 percent of

US workers expect to work for pay after retirement (Pew, 2006), and 40 percent expect to work past age 65 because of the recent economic downturn (Sass et al., 2010). Recent evidence indicates that Americans have already begun to delay retirement, marking a pause or reversal of the long-term trend toward earlier retirement (Friedberg, 2007).

These macroeconomic and demographic trends suggest that older workers may be more likely to reenter the labor force after a spell of retirement because of changes in both demand- and supply-side forces. Organizations increasingly demand a flexible contingent work force, and older workers themselves may be more inclined to work during retirement owing to better health management, greater longevity, access to part-time work hours, or financial necessity.

## Hypotheses

We hypothesize that the prevalence of post-retirement employment has increased over the past 30 years and we expect that this trend has been driven by three categories of determinants: 1) macroeconomic forces; 2) changes in the composition of the retired population; and 3) changes in the work-retirement behavior of older Americans. A determinant of post-retirement employment may influence the aggregate trend in employment transitions through compositional and/or behavioral effects. In the first case, if the composition of a population changes over time, a determinant may become more or less prominent in the population and thereby may affect the prevalence of employment transitions. This would result in a population compositional effect. In the second case, the association between the determinant and post-retirement employment changes over time, resulting in a behavioral effect. We first examine change in population composition and macroeconomic influences, and then use multivariate models to test for change in the determinants of post-retirement behavior and the degree to which change in population composition has affected the trends in post-retirement employment.

## Methods

### *Sample*

To examine trends in the prevalence and correlates of post-retirement employment we use a long series of short panels created by matching individual-level files from adjacent years of the *March Current Population Surveys* (CPS) for the years 1977–2010. We follow the procedure specified by Madrian and Lefgren (2000) to generate the 2-year longitudinal files. After selecting cases that are validly matched between each year, $t$, and its subsequent year, $t$+1,[3] and excluding non-civilians, respondents who had never worked, and individuals younger than 50 years of age, our analytical sample includes 257,597 individuals (164,347 females and 93,250 males; unweighted sample sizes) who are retired at $t$ and therefore at risk of reentering the labor force between $t$ and $t$+1. The sample sizes the CPS provides, in addition to the significant length of this time series, enable us to analyze post-retirement employment transitions across time and for various subpopulations.

A major limitation of using the CPS as a source for longitudinal data is that it provides observations for only two time points. The limited time span of the data has a number of consequences. First, it limits the ability to control for measureable differences between individuals (characteristics are measured for only one year prior to the survey), as well as the ability to control for unobserved heterogeneity through the inclusion of individual-fixed effects. Second, it limits the period of time over which post-retirement behavior can be observed, so our estimates of the probability of post-retirement employment will be downwardly biased. Despite its shortcomings, the utility of the CPS data is bolstered by its suitability for analyzing trends in post-retirement employment over an extensive historical period.

## *Variables*

*Retirement and post-retirement employment* As we are interested in the transition between retirement and work, we define these as mutually exclusive labor force statuses. Individuals are considered retired if they report having worked in the past, and were not in the labor force during the week preceding the year *t* survey. For this analysis we focus on two nested labor force transitions that retirees are at risk of experiencing between *t* and *t*+1: 1) the transition to employment among the total sample; and 2) the transition to full-time work among those who make the transition to employment.[4] By conceptualizing the process of post-retirement employment as sequential we avoid conflating behaviors that may have distinct sets of correlates and patterns of change over time. Individuals are coded as working at *t*+1 if they report being in the labor force and employed during the week prior to the *t*+1 survey. Full-time workers are those who report working 35 or more hours during the week prior to the *t*+1 survey and those who report that they usually work 35 or more hours but were absent from the labor force at the *t*+1 interview.

*Macroeconomic forces* Our analysis focuses on the influence of macroeconomic forces, the demographic composition of the retiree population, and behavioral changes on the prevalence of post-retirement employment. We measure the influence of macroeconomic trends with four variables. The first two are measures of local labor market characteristics: UNEMP, the unemployment rate in each respondent's local labor market at *t*, and INDPCT, the representation of manufacturing sector jobs in the local labor market. The source for UNEMP is the US Department of Labor, Bureau of Labor Statistics' Local Area Unemployment (LAU) Statistics program.[5] The second measure, INDPCT, captures the post-1970 shift away from industrial manufacturing and its impact on the US occupational structure. This measure is operationalized using cross-sectional CPS data for each year 1977−2009; an indicator of employment in manufacturing jobs (industry = manufacturing of durable or non-durable goods) for all employed individuals aged 18−59 is aggregated within local labor markets for each year, and this information is linked to the individuals in the CPS longitudinal files by labor market and year. For both UNEMP and INDPCT, the local labor market is operationalized as the metropolitan area or state of residence for each individual in our sample: we use the metro-level measures for individuals with valid metro area information; for individuals not living in

a metro area or for whom the metro-area information is missing we use the state-level operationalization.

The third measure of macroeconomic trends is an indicator of recessionary years, RECESSION, which is coded 1 for each year of the recessionary periods defined by the National Bureau of Economic Research.[6] The final macroeconomic indicator identifies the years in which the 2000 Senior Citizens Freedom to Work Act (SCFWA) was in force.

*Demographic characteristics* The demographic characteristics we include as indicators of post-retirement employment are sex, age, marital status, race, educational attainment, and change in marital status. SEX is a dichotomous indicator coded 1 for females. As the patterns of post-retirement employment are sex-specific, we conduct our analyses separately for males and females. Age is operationalized using linear (AGE) and quadratic ($AGE^2$) terms. MARITAL status is coded with a four-category nominal variable that distinguishes those who are married, widowed, divorced or separated, and never married. The variable RACE identifies respondents who are white, black, or other races. Educational attainment (EDUC) is a five-category variable that differentiates the completion of less than high school education, high school diploma, some college, a four-year college degree, and more than a four-year college degree. Each of the demographic variables is measured at time $t$ and they therefore precede labor force transitions that occur between $t$ and $t$+1. In contrast, we measure change in marital status concurrently with the observed transitions in labor force status. This variable, MARCHANGE, distinguishes individuals whose marital status was unchanged between $t$ and $t$+1, those who became widowed, divorced or separated, married, or experienced other marital status transitions.

*Income* We include two income measures that allow us to test if post-retirement employment is predicted by the income level of one's family (FAMINC) and/or one's level of retirement income (RETINC). We adjusted FAMINC for family size by converting it to a per-capita measure. Both income measures are standardized to constant 2009 dollars using the Consumer Price Index.[7]

*Health status and health insurance* To test the influence of health status and insurance coverage on post-retirement employment, we include a self-reported five-category ordinal measure of current health condition (HEALTH) and a dichotomous indicator of private health insurance coverage (INSURE). Both of these indicators are measure at $t$, prior to labor market reentry.[8]

*Retirement tenure* As the likelihood of post-retirement employment is expected to decline with years in retirement, it is important to control for the length of retirement tenure, but the CPS lacks retrospective retirement history data. The best measure of retirement tenure in the CPS is RETLASTYR, an indicator of whether a respondent was retired during the year prior to $t$.[9]

## Statistical methods

We examine the trend in post-retirement employment using regression models that specify linear and curvilinear functional forms for the yearly variation in the probability of post-retirement employment between 1977 and 2009. To identify the correlates of

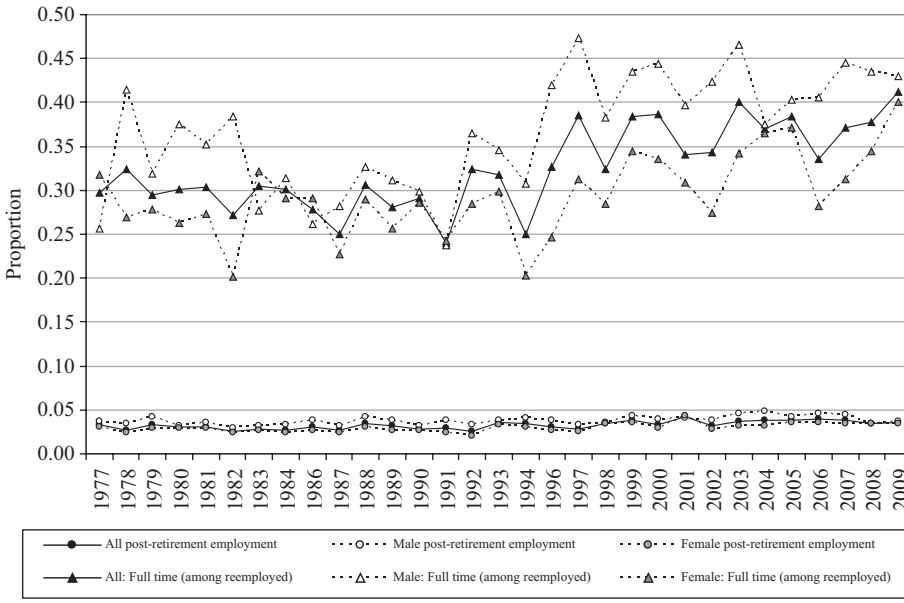


**Figure 1** Proportion of all retirees who are employed at year *t*+1 and proportion of those employed who work full-time.

post-retirement employment experiences we estimate multivariate models of post-retirement transitions using the repeated-panel data. To assess if the work-retirement behavior has changed since 1977, i.e. to assess if the correlates of labor force reentry among retirees have changed, we test for significant interactions between survey year and each of the covariates. Finally, we estimate the extent to which changes in the probability of post-retirement employment between 1977 and 2009 are attributable to the observed variation in 1) macroeconomic forces, 2) the characteristics of the retired population, or 3) changes in the influence of each determinant of post-retirement employment using a decomposition analysis that is described below in greater detail.

## Descriptive results

### *Trends in post-retirement employment*

Figure 1 presents the observed post-retirement employment rates for the full sample of retirees and separately for males and females. The percentage of all retirees who reenter the labor force after a spell of full retirement has remained small over the 30-year time period, averaging 3.7 percent and fluctuating between 2.7 percent and 4.7 percent, but following no discernible trend. Other studies using longitudinal data find post-retirement rates to be closer to 50 percent (Maestas, 2010; Pleau, 2010). The reason for this discrepancy is that the longitudinal studies use hazard analysis to estimate the rate at which individuals

return to paid employment after identifying as partially or fully retired, conditional on working at time *t*. For the current study, our sample includes everyone who was 50 or older, previously employed and already retired at time *t*. Warner et al. (2010) define as 'retired' everyone who is not working at time *t*, which ensures that women who identify as 'homemakers' or who had never worked are part of the retiree analytic sample, and which underestimates rates of retirement-to-work. These different types of studies are important for understanding the experience and trends of post-retirement employment, but their samples and methods differ, producing results that are not comparable.

The rate of post-retirement employment for males shown in Figure 1 is consistently higher than the rate for females, but neither sex-specific time series varies systematically. There is more variation in the rate of full-time (versus part-time) employment among the retirees who do return to work. On average, 32.5 percent of all retirees who work post-retirement do so full-time. This proportion varies from a low of 24.0 in 1991 to a high of 41.2 in 2009, but there is an observable upward trend in the likelihood of full-time employment starting in the early 1990s. This upward trend is experienced by both males and females, although the proportion of former retirees working full-time is significantly higher among men for most years in the post-1990 period.

## *Retiree demographics*

Table 1 presents sample means for the full sample of individuals who are retired at each *t*, the retirees who remain retired at *t*+1, and the retirees who reenter the labor force and are employed at each *t*+1. For the subsample of retirees who reenter the labor force, the means are presented for the full subsample and for those who work full- and part-time.

We find that post-retirement employment is significantly associated with an individual's age, sex, marital status, race, educational attainment, health, private health insurance coverage, and income. Reentry into employment is more common among the relatively young retirees who are male, married, non-white, more highly educated, who are only recently retired, and who have greater levels of both family and retirement income. Compared with retirees who remain retired, those who transition back to employment are also more likely to have experienced a change in marital status. Among the retirees who reenter the labor force, full-time employment is more likely for those who are young, male, non-white, who are divorced, separated or never married and are only recently retired. Post-retirement employment also is associated with local labor market conditions: reemployment is negatively associated with local unemployment rates and the representation of manufacturing jobs, although returning to work part-time is more likely among retirees who experience labor markets with greater concentrations of manufacturing jobs. We elaborate on these findings below.

Post-retirement labor force transitions are very clearly associated with age, sex, and race. The average age of all 'full' retirees in our pooled 30-year sample is 68.95 years. Retirees who make the transition to employment are significantly younger (61.7 years) than those who remained retired (69.23 years) and those who transitioned into full-time work were significantly younger (59.2 years) than those who transitioned into part-time work (62.8 years). Women are significantly more likely than men to retire and stay retired:

**Table 1** Sample means of demographic variables for all retirees at *t* and separately by labor force status at *t*+1

| | All retirees at year *t* | | Labor force status at year *t*+1 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Retired | | All | | Full-time | | Part-time | |
| | mean | (SD) | mean | (SD) | mean | (SD) | mean | (SD) | mean | (SD) |
| Sample size (*n*) | 257,597 | | 248,909 | | 8688 | | 2838 | | 5850 | |
| Age continuous | 68.952 | (9.418) | 69.225 | (9.355) | 61.650 | (7.962)*** | 59.198 | (7.292) | 62.767 | (8.004)††† |
| Sex (1 = female) | 0.638 | (0.481) | 0.641 | (0.480) | 0.575 | (0.494)*** | 0.520 | (0.500) | 0.600 | (0.490)††† |
| Race | | | | | | | | | | |
| White | 0.891 | (0.311) | 0.892 | (0.310) | 0.873 | (0.333)*** | 0.847 | (0.360) | 0.884 | (0.320)††† |
| Black | 0.090 | (0.285) | 0.089 | (0.285) | 0.100 | (0.300)*** | 0.117 | (0.321) | 0.093 | (0.290)††† |
| Other | 0.019 | (0.138) | 0.019 | (0.137) | 0.027 | (0.162)*** | 0.037 | (0.188) | 0.023 | (0.149)††† |
| Educational attainment | | | | | | | | | | |
| Less than high school | 0.422 | (0.494) | 0.427 | (0.495) | 0.282 | (0.450)*** | 0.289 | (0.454) | 0.279 | (0.448) |
| High school diploma | 0.342 | (0.474) | 0.341 | (0.474) | 0.379 | (0.485)*** | 0.390 | (0.488) | 0.374 | (0.484) |
| Some college | 0.129 | (0.336) | 0.128 | (0.334) | 0.175 | (0.380)*** | 0.159 | (0.365) | 0.182 | (0.386)†† |
| College degree | 0.069 | (0.253) | 0.068 | (0.251) | 0.097 | (0.295)*** | 0.097 | (0.296) | 0.096 | (0.295) |
| More than 4 yrs of college | 0.038 | (0.191) | 0.037 | (0.188) | 0.068 | (0.252)*** | 0.065 | (0.246) | 0.069 | (0.254) |
| Marital status at *t* | | | | | | | | | | |
| Married | 0.617 | (0.486) | 0.614 | (0.487) | 0.736 | (0.441)*** | 0.725 | (0.446) | 0.740 | (0.438) |
| Widowed | 0.269 | (0.444) | 0.274 | (0.446) | 0.130 | (0.336)*** | 0.107 | (0.309) | 0.140 | (0.347)††† |
| Divorced, separated | 0.067 | (0.250) | 0.066 | (0.248) | 0.090 | (0.287)*** | 0.113 | (0.317) | 0.080 | (0.271)††† |
| Never married | 0.046 | (0.210) | 0.046 | (0.210) | 0.044 | (0.206) | 0.055 | (0.227) | 0.039 | (0.195)†† |
| Health status | | | | | | | | | | |
| Excellent | 0.102 | (0.303) | 0.100 | (0.300) | 0.164 | (0.370)*** | 0.170 | (0.375) | 0.160 | (0.367) |
| Very good | 0.202 | (0.402) | 0.200 | (0.400) | 0.255 | (0.436)*** | 0.232 | (0.422) | 0.269 | (0.443)†† |
| Good | 0.323 | (0.468) | 0.322 | (0.467) | 0.330 | (0.470) | 0.342 | (0.475) | 0.322 | (0.467) |

*(Continued)*

**Table 1** (Continued)

| | All retirees at year *t* | | Labor force status at year *t*+1 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Retired | | All | | Full-time | | Part-time | |
| | mean | (SD) | mean | (SD) | mean | (SD) | mean | (SD) | mean | (SD) |
| Fair | 0.234 | (0.423) | 0.236 | (0.425) | 0.180 | (0.384)*** | 0.183 | (0.387) | 0.178 | (0.383) |
| Poor | 0.139 | (0.346) | 0.142 | (0.349) | 0.072 | (0.258)*** | 0.073 | (0.261) | 0.071 | (0.256) |
| Have private health insurance | 0.413 | (0.492) | 0.413 | (0.492) | 0.393 | (0.489)** | 0.417 | (0.493) | 0.383 | (0.486)†† |
| Change in marital status between *t* and *t*+1 | | | | | | | | | | |
| No change in marital status | 0.976 | (0.153) | 0.976 | (0.152) | 0.970 | (0.170)*** | 0.972 | (0.165) | 0.969 | (0.172) |
| Became widowed | 0.017 | (0.131) | 0.017 | (0.131) | 0.017 | (0.128) | 0.013 | (0.112) | 0.018 | (0.134) |
| Became divorced, separated | 0.002 | (0.048) | 0.002 | (0.046) | 0.007 | (0.084)*** | 0.006 | (0.077) | 0.008 | (0.087) |
| Became Married | 0.003 | (0.051) | 0.003 | (0.051) | 0.004 | (0.064)** | 0.006 | (0.080) | 0.003 | (0.054)† |
| Other change | 0.004 | (0.065) | 0.004 | (0.065) | 0.005 | (0.068) | 0.006 | (0.077) | 0.004 | (0.063) |
| Family income (per person in $1000) | 21.634 | (0.020) | 21.512 | (0.020) | 25.432 | (0.025)*** | 24.658 | (0.024) | 25.785 | (0.025)† |
| Retirement income (in $1000) | 11.278 | (0.012) | 11.378 | (0.012) | 8.682 | (0.014)*** | 6.602 | (0.013) | 9.629 | (0.014)††† |
| Retirement tenure (1 = retired prior to *t*) | 0.539 | (0.498) | 0.550 | (0.498) | 0.265 | (0.441)*** | 0.244 | (0.430) | 0.275 | (0.446)†† |
| Labor market characteristics at *t* | | | | | | | | | | |
| Unemployment rate | 6.291 | (2.309) | 6.297 | (2.310) | 6.062 | (2.238)*** | 5.995 | (2.238) | 6.093 | (2.237) |
| % industrial manufacturing | 18.923 | (7.507) | 18.937 | (7.507) | 18.510 | (7.491)*** | 18.022 | (7.642) | 18.732 | (7.411)††† |

*$p \leq 0.05$, **$p \leq 0.01$, ***$p \leq 0.001$, for two-tailed test of differences in means between those who remain retired and those who are employed at *t*+1.
†$p \leq 0.05$, ††$p \leq 0.01$, †††$p \leq 0.001$, for two-tailed test of differences in means between those employed full-time and those employed part-time at *t*+1.

women represented 63.8 percent of all retirees but they are only 57.5 percent of the retirees who reenter the labor force, and women are overrepresented among part-time workers. Black people and members of other non-white races are overrepresented among retirees who reenter the labor force and work full-time, whereas white people are overrepresented among retirees who return to work part-time.

Educational attainment is positively associated with post-retirement employment but does not differentiate the transition to full- or part-time work. Retirees with less than a high school diploma are more likely to remain retired than to reenter the labor force, whereas retirees who finish or go beyond a secondary education are overrepresented among reemployed retirees.

Marital status has a notable association with post-retirement employment transitions. Married retirees are more likely to experience post-retirement employment (73.6%) than they are to remain retired (61.4%). Widowed retirees are overrepresented among those who remain retired, whereas those who are divorced or separated are overrepresented among those who reenter the labor force. Married retirees are equally likely to work full- or part-time, but reemployed retirees who are widowed are the most likely to work part-time and retirees who are divorced/separated or never married are more likely to work full-time. Marital status stability between years $t$ and $t$+1 is positively associated with remaining retired, but becoming divorced/separated or married is positively associated with labor force reentry.

Retirees reporting their health status to be 'excellent' or 'very good' are overrepresented among those who reenter the labor market, while those reporting 'fair' or 'poor' health are overrepresented among retirees who stay out of the labor market. Retirees with private health insurance are less likely to reenter employment, but those who reenter are more likely to work full- rather than part-time hours.

*Shifts in macroeconomic forces and retiree demographics* Our descriptive analysis identified significant temporal variation for two macroeconomic and a few demographic characteristics. The mean state-level unemployment rates experienced by the retirees for 1977−2009 followed a general declining trend while cyclically fluctuating and ending with a significant jump to 9.14 percent in 2009.[10] The representation of manufacturing jobs declined monotonically from 24.50 to 11.03 percent in the local labor markets where the retirees resided.

The well-documented aging of the US population is reflected in our sample of retirees. Average age increased by more than one year (from 68.36 to 69.79 years) between 1977 and 2009, and as post-retirement employment is likely to be most common among the relatively young retirees, the declining relative representation of 'young' retirees may reduce the rates of post-retirement employment. The increasing longevity of retirees may depress the rates of post-retirement employment through its influence on retirement tenure. As time out of the labor force is negatively associated with reentry, the increasing representation of retirees with many years of labor force absence will likely depress aggregate post-retirement employment rates. The secular trend of increasing educational attainment is reflected in the sample of retirees: the representation of baccalaureates among this group more than doubled between 1977 and 2009. If opportunities for labor force reentry depend on educational attainment, this shift may drive increased post-retirement employment. Our sample also

reflects the secular changes in health insurance coverage: the proportion of retirees reporting they have private health insurance declined from 0.62 in 1983 (the first year this indicator is available in the CPS) to 0.41 in 2009. This trend may generate increasing rates of post-retirement employment if inadequate insurance drives individuals into the labor market where they can access employer-provided insurance.

## Multivariate results

### *Trends in post-retirement employment*

We test for linear and curvilinear trends in the likelihood of both post-retirement employment and full-time employment among those who reenter the labor force with two different specifications of a reduced-form logit model of these post-retirement outcomes. These models estimate the marginal effect of year on post-retirement labor force outcomes for males and females separately and include no other covariates. The first model specification includes only the continuous YEAR variable and tests for linear trends in the likelihood of employment (among all retirees) and full-time work (among those who return to employment) at year $t$+1. The second model specification adds a quadratic term for year ($YEAR^2$) and thereby tests for curvilinear trends in post-retirement labor force participation.[11]

The estimated coefficients and goodness-of-fit statistics for the sex-specific linear and curvilinear models are presented in Table 2. For females, the curvilinear specification for the trend in labor force reentry is the best fit with the data (Panel A): the estimated coefficient for $YEAR^2$ is statistically significant and the addition of the quadratic term to the linear model reduces the value of the Bayesian Information Criterion (BIC) measure of model fit.[12] The estimated coefficients indicate that the rate of post-retirement employment for females followed a slight U-shaped trend, but the small magnitude of the estimated coefficients shows that the trend only slightly departs from a linear form. For males, the linear specification for YEAR fits the data best: the estimated coefficient for $YEAR^2$ in the curvilinear specification is not statistically significant, nor does the addition change the value of BIC. This best-fitting linear model indicates a slight upward trend in the likelihood of post-retirement employment among men.

The models for the trend in full-time versus part-time employment indicate a U-shaped curvilinear trend for all reemployed retirees (Panel B). For both females and males the quadratic term in the curvilinear model is statistically significant and its addition is associated with a slight decrease in the value of BIC, indicating that the curvilinear model is the best-fitting. In both gender-specific curvilinear models, the combination of nonsignificant YEAR coefficient and significantly positive $YEAR^2$ coefficient indicate that the trend in the likelihood of full-time employment was flat at the start of the observed period but then turned upward. The upward trend is estimated to start in the late-1980s for males but not until the mid- to late-1990s for females. As we find the curvilinear specification to be the best-fitting for three of the four sex-by-outcome models, we use it as the basis for estimating the demographic and macroeconomic determinants of post-retirement employment.

**Table 2** Estimated coefficients and model goodness-of-fit statistics for logit models of employment

| | Females | | | | Males | | | |
|---|---|---|---|---|---|---|---|---|
| | Model 1: Linear Specification | | Model 2: Curvilinear Specification | | Model 1: Linear Specification | | Model 2: Curvilinear Specification | |
| | *b* | se(*b*) | *b* | se(*b*) | *b* | se(*b*) | *b* | se(*b*) |
| *Panel A: Logit of employment at t+1 (among all retirees)* | | | | | | | | |
| Estimated coefficient | | | | | | | | |
| Intercept | –3.634 | (0.035)*** | –3.520 | (0.047)*** | –3.359 | (0.043)*** | –3.323 | (0.062)*** |
| YEAR | 0.007 | (0.002)** | –0.018 | (0.007)* | 0.006 | (0.003)* | –0.001 | (0.009) |
| YEAR$^2$ | | | 0.001 | (0.000)*** | | | 0.000 | (0.000) |
| Model goodness-of-fit | | | | | | | | |
| Pseudo $R^2$ | 0.000 | | 0.001 | | 0.000 | | 0.000 | |
| BIC | 530710.1 | | 530545.40 | | 369130.2 | | 369131.40 | |
| *Panel B: Logit of full-time employment at t+1 (among all retirees who are employed)* | | | | | | | | |
| Estimated coefficient | | | | | | | | |
| Intercept | –1.056 | (0.075)*** | –0.912 | (0.103)*** | –0.919 | (0.092)*** | –0.701 | (0.128)*** |
| YEAR | 0.010 | (0.005) | –0.022 | (0.016) | 0.023 | (0.006)*** | –0.021 | (0.019) |
| YEAR$^2$ | | | 0.001 | (0.001)* | | | 0.002 | (0.001)** |
| Model goodness-of-fit | | | | | | | | |
| Pseudo $R^2$ | 0.001 | | 0.002 | | 0.005 | | 0.007 | |
| BIC | 69330.43 | | 69277.88 | | 55627.77 | | 55546.92 | |

*$p \leq 0.05$, **$p \leq 0.01$, ***$p \leq 0.001$.

## *Determinants of post-retirement employment 1977–2009*

The estimated coefficients for the best-fitting sex-specific logit models of post-retirement employment transitions are presented in Table 3. We arrived at these models by first estimating a complete additive model for each of the two post-retirement employment outcomes – employment and full-time work – separately for males and females. We then test for change over time in the determinants of post-retirement employment by testing for significant interactions between each of the covariates and YEAR and YEAR$^2$, introducing each pair of covariate*YEAR and covariate*YEAR$^2$ interactions separately to the sex-specific additive models of post-retirement employment transitions. None of the covariate*YEAR$^2$ interactions were found to be statistically significant. The full models indicate which of the macroeconomic and demographic influences is associated with post-retirement employment and how that influence has shifted over the past three decades.

*Macroeconomic determinants* Post-retirement employment behavior is sensitive to macroeconomic influences. In the context of our full set of controls for individual-level characteristics, local labor market unemployment and the representation of manufacturing are negatively associated with the likelihood of post-retirement employment for both

men and women. Neither is associated with the choice between full- or part-time work among female retirees, but they are both associated with full-time work among men: the unemployment rate is positively associated with full- versus part-time employment, but greater representation of manufacturing decreases the likelihood of full-time post-retirement work. Recessionary periods and the enactment of SCFWA are both associated with lesser likelihood of post-retirement employment, but neither is associated with the work hours of retirees who reenter the labor force.

*Demographic determinants of return to employment* The likelihood of labor force reentry for both male and female retirees is significantly associated with each of the demographic, income, and health indicators included in the model. For the majority of the determinants, the association with reemployment is comparable for male and female retirees, but for a few of the covariates the association is distinctly gender-specific. Similarly, the estimated influence of each of the determinants of post-retirement employment are stable over the 33-year period, but for three determinants – family income, retirement income and retirement tenure – the association with labor market reentry changes over the observed time period.

The estimated coefficients for AGE and $AGE^2$ shown in Table 3 indicate that, for both male and female retirees, the odds of making the transition from retirement to employment are greatest among the youngest retirees and they progressively decline with age. In contrast, post-retirement labor force participation is positively associated with educational attainment. The odds of employment among female college-educated retirees are (exp(0.653) = 1.921) 92 percent greater than the odds of re-employment among female retirees with less than a high school education. The odds of employment among college-educated male retirees are (exp(0.641) = 1.898) 90 percent greater than the odds for retirees who did not graduate high school. Non-white retirees are more likely than white retirees to reenter the labor force, and this racial gap is consistent for both genders.

Marital status is a significant predicator of post-retirement employment for both males and females, but the influence varies by sex. Unpartnered women – those who are widowed, divorced/separated, or never married – have the greatest odds of reentering the labor force, but for men, being unattached significantly lowers the odds of reemployment. Marriage thus lessens the odds of reemployment among women, but raises the odds of reemployment among men. In contrast, experiencing a change in marital status between $t$ and $t$+1 increases the odds of post-retirement employment similarly for both male and female retirees.

The association between family income and post-retirement employment is gender-specific: there is no association for women, but among men family income has a positive association with reemployment that has declined over time (the interaction with YEAR is significantly negative). In contrast, retirement income is negatively associated with post-retirement employment for both men and women, and the strength of the association has weakened over time for all retirees (the interaction with YEAR is significantly positive, which lessens the magnitude of the negative coefficient for RETINC).

Retirement tenure is the third gender-specific determinant of post-retirement labor force reentry. Retirement tenure is negatively associated with post-retirement employment and the association has strengthened over time (the interaction with YEAR is significantly negative, which increases the magnitude of the negative coefficient for RETENURE) for

**Table 3** Estimated coefficients for sex-specific logit models of employment and full-time hours at *t*+1

| | Probability of employment at *t*+1 (among all retirees) | | | | Probability of full-time employment (among retirees who are employed) | | | |
|---|---|---|---|---|---|---|---|---|
| | Females | | Males | | Females | | Males | |
| | *b* | se(*b*) | *b* | se(*b*) | *b* | se(*b*) | *b* | se(*b*) |
| Intercept | −1.100 | (0.239)*** | −1.918 | (0.284)*** | 6.082 | (2.871)* | 14.741 | (2.829)*** |
| YEAR | −0.010 | (0.004)** | −0.004 | (0.005) | −0.029 | (0.033) | 0.019 | (0.042) |
| YEAR$^2$ | 0.001 | (0.000)*** | 0.001 | (0.000)*** | 0.001 | (0.001) | −0.001 | (0.001) |
| AGE | 0.028 | (0.007)*** | 0.050 | (0.008)*** | −0.168 | (0.092) | −0.388 | (0.085)*** |
| AGE$^2$ | −0.001 | (0.000)*** | −0.001 | (0.000)*** | 0.001 | (0.001) | 0.002 | (0.001)*** |
| Marital status at *t* (excluded = Married) | | | | | | | | |
| Widowed | 0.288 | (0.013)*** | −0.293 | (0.023)***††† | 0.405 | (0.132)** | 0.120 | (0.217) |
| Divorced, separated | 0.388 | (0.016)*** | −0.353 | (0.020)***††† | 0.477 | (0.150)*** | −0.050 | (0.188)† |
| Never married | 0.271 | (0.022)*** | −0.541 | (0.024)***††† | 0.650 | (0.229)** | −0.059 | (0.292) |
| Race (excluded = White) | | | | | | | | |
| Black | 0.110 | (0.015)*** | 0.099 | (0.017)*** | 0.158 | (0.150) | 0.053 | (0.182) |
| Other | 0.082 | (0.027)** | 0.276 | (0.031)*** | 0.716 | (0.236)** | −0.217 | (0.360)† |
| Educational attainment (excluded = Less than high school) | | | | | | | | |
| High school diploma | 0.408 | (0.011)*** | 0.376 | (0.013)*** | −0.170 | (0.108) | 0.084 | (0.133) |
| Some college | 0.623 | (0.014)*** | 0.543 | (0.016)*** | −0.518 | (0.141) | −0.069 | (0.158)† |
| College degree | 0.653 | (0.018)*** | 0.641 | (0.019)*** | −0.379 | (0.181)* | 0.156 | (0.197)† |
| More than 4 yrs of college | 1.003 | (0.023)*** | 0.912 | (0.021)*** | −0.359 | (0.240) | 0.133 | (0.204) |
| Family income (in $1000) | 0.000 | (0.000) | 0.011 | (0.001)***††† | 0.001 | (0.002) | 0.004 | (0.002) |
| YEAR*Family income | 0.000 | (0.000) | −0.0005 | (0.0000)***††† | | | | |
| Missing | 0.630 | (0.075)*** | 0.365 | (0.136)** | 0.035 | (0.516) | 1.730 | (1.163) |
| Retirement income (in $1000) | −0.027 | (0.002)*** | −0.017 | (0.001)*** | −0.049 | (0.010)*** | −0.014 | (0.004)***††† |
| YEAR*Retirement income | 0.001 | (0.000)*** | 0.0004 | (0.0001)*** | | | | |

*(Continued)*

**Table 3** (Continued)

| | Probability of employment at *t*+1 (among all retirees) | | | | Probability of full-time employment (among retirees who are employed) | | | |
|---|---|---|---|---|---|---|---|---|
| | Females | | Males | | Females | | Males | |
| | *b* | se(*b*) | *b* | se(*b*) | *b* | se(*b*) | *b* | se(*b*) |
| Retired last year (1 = yes) | −0.450 | (0.029)*** | −0.847 | (0.023)***† | 0.212 | (0.132) | 0.346 | (0.117)** |
| YEAR*Retired last year | −0.024 | (0.002)*** | −0.014 | (0.001)*** | | | | |
| Health status at *t* (excluded = Excellent) | | | | | | | | |
| Very good | 0.104 | (0.115) | −0.146 | (0.133) | −0.412 | (0.241) | 0.212 | (0.261) |
| Good | 0.050 | (0.114) | −0.244 | (0.127) | −0.037 | (0.230) | 0.251 | (0.260) |
| Fair | −0.336 | (0.319)* | −0.678 | (0.150)*** | −0.185 | (0.268) | −0.125 | (0.320) |
| Poor | −1.284 | (0.195)*** | −1.255 | (0.177)*** | 0.137 | (0.402) | −0.357 | (0.355) |
| Missing | −0.154 | (0.125) | −0.243 | (0.140) | −0.194 | (0.251) | −0.504 | (0.288) |
| Have private health insurance at *t* | −0.080 | (0.011)*** | −0.207 | (0.013)*** | 0.000 | (0.105) | 0.023 | (0.128) |
| Change in marital status between *t* and *t*+1 (excluded = No change in marital status) | | | | | | | | |
| Became widowed | 0.469 | (0.032)*** | 0.090 | (0.054) | 0.364 | (0.323) | −1.588 | (0.858) |
| Became divorced, separated | 1.090 | (0.048)*** | 0.372 | (0.079)*** | 0.090 | (0.419) | −0.732 | (0.925) |
| Became married | 0.170 | (0.074)* | 0.342 | (0.076)*** | 0.178 | (0.692) | 0.118 | (0.609) |
| Other change | −0.082 | (0.060) | 0.190 | (0.104) | −0.091 | (0.584) | 0.884 | (1.019) |
| Labor market characteristics | | | | | | | | |
| Unemployment rate | −0.046 | (0.002)*** | −0.056 | (0.003)*** | −0.019 | (0.022) | 0.054 | (0.027)*† |
| % industrial manufacturing | −0.007 | (0.001)*** | −0.001 | (0.001)* | −0.003 | (0.006) | −0.018 | (0.007)* |
| Senior Citizens Freedom to Work Act | −0.199 | (0.023)*** | −0.085 | (0.025)*** | 0.081 | (0.228) | −0.052 | (0.253) |
| Recessionary period | −0.051 | (0.011)*** | −0.086 | (0.013)*** | −0.143 | (0.102) | −0.027 | (0.127) |
| Pseudo $R^2$ | 0.119 | | 0.100 | | 0.054 | | 0.113 | |
| Number of obs | 164,249 | | 93,160 | | 5,036 | | 3,641 | |

*Note*: Statistical significance of individual estimated coefficients designated: *$p \leq 0.05$, **$p \leq 0.01$, ***$p \leq 0.001$. Results of Wald test of equality of female- and male-specific coefficients denoted: †$p \leq 0.05$, ††$p \leq 0.01$, †††$p \leq 0.001$.

both men and women, but the association is significantly stronger for men: for example, having been retired in 1976 as well as 1977 decreased the odds of reemployment in 1978 by (1 − exp(−0.847) = 1 − 0.429) 57 percent for men, but by only (1 − exp(−0.450) = 1 − 0.638) 36 percent for women.

Health status and private health insurance coverage are robust determinants of post-retirement employment and they operate similarly for males and females. Retirees reporting 'good' or 'very good' health are as likely as those with 'excellent' health to reenter the labor force. In contrast, for retirees with 'fair' or 'poor' health at *t* the odds of reentering the labor force at *t*+1 are 28 to 72 percent lower than the reemployment odds for retirees with 'excellent' health. Having private health insurance decreases the odds of reemployment by (1 − exp(−0.080) = 1 − 0.923) 7 percent for women and (1 − exp(−0.207) = 1 − 0.813) 18.7 percent for men.

*Demographic determinants of full-time employment among re-employed retirees* Fewer of the determinants of post-retirement employment are significantly associated with whether a retiree returns to full- or part-time employment, but many of the determinants of full-time employment are gender-specific.

Age is negatively associated with full-time employment for male but not female retirees. There are significant race differences in the likelihood of full-time employment among women, but not men. For women of non-white races, the odds of full-time rather than part-time post-retirement employment are (exp(0.716) = 2.046) twice the odds for white women. Marital status and educational attainment are associated with the hours worked in post-retirement employment for women only. Female retirees who are married are the least likely to return to full-time work, whereas those who never married have the greatest odds of working full-time in post-retirement employment. Women with some college or a college degree are significantly less likely than less-educated women to work full-time, i.e., they are more likely to work part-time.

Retirement tenure is positively associated with full-time employment among men only: compared with newly retired men, the odds of full-time employment are 40 percent greater (exp(0.346) = 1.41) for men who have experienced at least two years of retirement. And finally, retirement income is negatively associated with full-time work among both male and female retirees who return to employment, but the association is stronger for women: each $1000 in retirement income is estimated to decrease the likelihood of full-time work by (1 − exp(−0.049) = 1 − 0.952) 4.8 percent for women and (1 − exp(−0.014) = 1 − 0.986) 1.4 percent for men. The time-lag in the operationalization of our variables provides some justification for using causal language to describe the relationship: higher levels of retirement income allow women to remain in retirement or to limit their post-retirement work hours.

## *Estimating the population compositional and behavioral effects on trends in post-retirement employment*

The descriptive and multivariate results identify many factors that may influence the trend in post-retirement employment: the multivariate logit models identify significant predictors of post-retirement employment for which: 1) there has been considerable change in the population distribution; and 2) the association with post-retirement

employment has shifted significantly over the past three decades. While some changes in the population composition and in the determinants of post-retirement employment may have had positive effects on post-retirement employment, others may have had offsetting negative effects. To sort out the countervailing influences of demographic and behavioral changes on the likelihood of post-retirement employment, we conduct a decomposition analysis that addresses two counterfactual questions:

1. Given the macroeconomic and demographic determinants of post-retirement employment over the observed time period, what effect have changes in the population distribution of each determinant had on the probability of post-retirement employment between 1977 and 2009?
2. Given the observed changes in the association between post-retirement employment and specific determinants, what effect have the observed shifts in the effects of the determinants had on the probability of post-retirement employment over the past three decades?

To address the first counterfactual question, we use the estimated coefficients from the sex-specific logit models of post-retirement employment transitions to estimate the predicted probability of post-retirement employment at the start (YEAR = 1977) and finish (YEAR = 2009) of the observed time period. With YEAR set to its mean value the coefficients from these pooled-year models represent the best estimates of the average relationship between post-retirement employment and each of the economic and demographic factors across the three decades. Using this set of 'average' estimated coefficients and the 1977 means for each of the covariates as the weights, we calculate the predicted probabilities of post-retirement employment in 1977 for male and female retirees. These 1977 predicted probabilities represent the rates of post-retirement employment that would have been observed given the 1977 population composition and macroeconomic context. We then alternately substitute the 2009 population distribution of each covariate (or set of indicator variables capturing the categories of the categorical variables), while holding all other variables constant at their 1977 means, and recalculate the predicted probability based on each new configuration of the population composition. We compare the 2009 predicted probabilities with the 1977 baseline probabilities to estimate the influence that changes in the population distribution of each covariate had on the aggregate probability of post-retirement employment transitions.

This procedure provides an estimate of the change that would have occurred if the distribution of a single variable had changed and all other demographics and macroeconomic forces else had remained constant at their 1977 levels. By varying the distribution of one variable at a time, this decomposition analysis identifies the separate influence of each determinant on the observed trends in post-retirement employment probabilities.

To address the second counterfactual, we use this same decomposition exercise but vary the estimated coefficients of the covariates that we find to change significantly across the time period (those covariates with significant *YEAR interactions) and apply these to the pooled-year population average distribution of the covariates. The results of this part of the decomposition analysis estimate the degree to which changes in behavior have contributed to trends in post-retirement employment.

Table 4 presents the results of the decomposition exercise. Panel A presents the estimates of the influence of changing population composition, i.e., the results that relate to the first counterfactual question. Panel B presents the estimated influence of behavioral change, i.e., the results that address the second counterfactual. The first row of each panel presents the predicted employment outcomes given the 1977 population structure (Panel A) or estimated covariate effects (Panel B). The second line presents the predicted probabilities for post-retirement outcomes using the 2009 population means for the full set of covariates (Panel A) or estimated effects for the determinants with significant *YEAR interactions (Panel B).

For women, the probabilities of both post-retirement employment transitions predicted based on the 2009 population composition are less than the baseline 1977 probability. The '% change' compares the 1977 and 2009 probabilities, and this difference represents the total change in likelihood of post-retirement employment that is attributable to shifts in the population distributions of the covariates. The results suggest that, had the *influence* of the determinants remained constant, the observed changes in the population *distributions* of the determinants would have caused the probability of post-retirement employment among female retirees to decline by 46.7 percent and the probability of full-time employment to decline by 18 percent. For male retirees, the aggregated effect of changes in the distribution of the determinants of post-retirement employment produced a decline of only 9.6 percent in the likelihood of post-retirement labor force reentry, but increased the likelihood of full-time employment by 33.6 percent. Each remaining line in Panel A of Table 4 presents the post-retirement transition probabilities we would expect if the indicated variable assumes the 2009 distribution but the distribution of all other variables remained unchanged at their 1977 level.

The results in Panel A show that the increasing educational attainment of the retiree population was the only demographic change that significantly increased the rate at which retirees returned to work. We estimate that growth in the population of college-educated retirees, had it been the only change to occur between 1977 and 2009, would have generated a 24 percent increase in reemployment among women and 29 percent increase among men. The effect of increasing educational attainment on labor market reentry is consistent for men and women, but the results of the decomposition show that changes in the population composition of the other determinants: 1) had countervailing negative effects on the likelihood of retiree reemployment; and 2) generally had greater effects on the aggregate post-retirement behavior of women than men.

The increasing average age of retirees, the increasing representation of retirees with two or more years of retirement, increasing unemployment, and the policy change introduced by the SCFWA all exerted significant negative influences on the probability of post-retirement employment for women. The aging of the retiree population did not significantly influence retired men's prevalence of reemployment, although declines in private health insurance coverage, changing unemployment rates, the SCFWA enactment, and the influence of economic recessions each contributed downward pressure on the trend in labor force reentry among men.

The changing population composition and macroeconomic context had modest effects on the trend in full- versus part-time work among reemployed retirees. For women, increasing educational attainment, increasing average retirement income, and the experience

**Table 4** Decomposition of total percent change in the predicted probability of post-retirement employment between 1977 and 2009, by labor force transition and sex

| | Probability of employment at *t*+1 (among all retirees) | | | | Probability of full-time employment (among all retirees who are employed) | | | |
|---|---|---|---|---|---|---|---|---|
| | Females | | Males | | Females | | Males | |
| | Probability[a] | %change[b] | Probability[a] | %change[b] | Probability[a] | %change[b] | Probability[a] | %change[b] |
| *Panel A: Influence of changing population composition* | | | | | | | | |
| Estimated coefficients from additive logit model applied to: | | | | | | | | |
| Complete population structure from: | | | | | | | | |
| 1977 (Baseline for %change) | 0.018 | | 0.018 | | 0.282 | | 0.324 | |
| 2009 | 0.010 | −46.70 | 0.016 | −9.56 | 0.231 | −17.99 | 0.433 | 33.62 |
| 1977 distribution for all covariates except 2009 distribution of: | | | | | | | | |
| Age | 0.015 | −18.56 | 0.018 | 0.69 | 0.286 | 1.27 | 0.354 | 9.21 |
| Marital status | 0.018 | −1.65 | 0.018 | −0.32 | 0.275 | −2.51 | 0.323 | −0.46 |
| Race | 0.018 | 0.64 | 0.018 | 1.19 | 0.287 | 1.67 | 0.324 | −0.16 |
| Educational attainment | 0.022 | 24.16 | 0.023 | 28.81 | 0.258 | −8.71 | 0.332 | 2.54 |
| Family income | 0.018 | 0.11 | 0.019 | 8.29 | 0.286 | 1.20 | 0.331 | 2.13 |
| Retirement income | 0.017 | −4.33 | 0.017 | −5.72 | 0.260 | −7.93 | 0.309 | −4.70 |
| Retired last year | 0.012 | −32.80 | 0.016 | −11.05 | 0.291 | 3.04 | 0.338 | 4.46 |
| Health status | 0.018 | 3.44 | 0.018 | 1.18 | 0.278 | −1.59 | 0.333 | 2.91 |
| Have private health insurance at *t* | 0.018 | 1.93 | 0.018 | 2.41 | 0.282 | 0.00 | 0.323 | −0.41 |
| Change in marital status | 0.018 | −1.00 | 0.018 | −0.49 | 0.280 | −0.81 | 0.323 | −0.32 |
| Unemployment rate | 0.016 | −7.67 | 0.016 | −9.18 | 0.276 | −2.24 | 0.350 | 7.93 |
| % industrial manufacturing | 0.020 | 9.84 | 0.018 | 1.87 | 0.289 | 2.50 | 0.372 | 14.74 |
| Senior Citizens Freedom to Work Act | 0.015 | −17.78 | 0.016 | −8.02 | 0.299 | 5.90 | 0.313 | −3.51 |
| Recessionary period | 0.017 | −4.84 | 0.016 | −8.11 | 0.254 | −9.94 | 0.318 | −1.83 |

**Table 4** (Continued)

| | Probability of employment at *t*+1 (among all retirees) | | | | Probability of full-time employment (among all retirees who are employed) | | | |
|---|---|---|---|---|---|---|---|---|
| | Females | | Males | | Females | | Males | |
| | Probability[a] | %change[b] | Probability[a] | %change[b] | Probability[a] | %change[b] | Probability[a] | %change[b] |
| *Panel B: Influence of change in the estimated effects of covariates* | | | | | | | | |
| Mean population distribution from pooled 30-year sample applied to average coefficients for all covariates except: | | | | | | | | |
| All covariates that interact with year are set to estimates for | | | | | | | | |
| 1977 (Baseline for %change) | 0.019 | | 0.033 | | | | | |
| 2009 | 0.013 | −34.52 | 0.019 | −42.57 | | | | |
| Family income set to estimates for | | | | | | | | |
| 1977 (Baseline for %change) | 0.018 | | 0.031 | | | | | |
| 2009 | 0.013 | −27.15 | 0.020 | −37.13 | | | | |
| Retirement income set to estimates for | | | | | | | | |
| 1977 (Baseline for %change) | 0.016 | | 0.024 | | | | | |
| 2009 | 0.015 | −5.59 | 0.026 | 9.462 | | | | |
| Retirement tenure set to estimates for | | | | | | | | |
| 1977 (Baseline for %change) | 0.022 | | 0.031 | | | | | |
| 2009 | 0.011 | −50.46 | 0.020 | −35.58 | | | | |

[a]Panel A: Probability predicted using the complete set of coefficients from the pooled-year logit models of post-retirement employment (specific to employment transition and sex; reported in Table 3) weighted by the specified combination of 1977 and 2009 population means for each of the covariates. Panel B: Probability predicted using year-specific (with YEAR set to either 1977 or 2009) coefficients for the covariates that interact significantly with YEAR, weighted by the mean population distribution for the full 1977–2009 pooled sample for each of the covariates.

[b]Percent change is relative to predicted probability of post-retirement employment using 1977 sample means for the complete set of covariates to represent the population structure (Panel A) or 1977 value for the estimated coefficients (Panel B).

of economic recessions all contributed to reducing the likelihood of full-time employment relative to the likelihood of part-time post-retirement employment among the retirees who reentered the labor force. For men, the aging of the population, increasing unemployment rates, and declining representation of manufacturing jobs all contributed modestly to increasing the likelihood of full-time post-retirement employment.

As discussed above, we find that the association between post-retirement reemployment and family income, retirement income, and retirement tenure changed over the observed time period. Our estimates of how these shifts in the influence of the determinants contributed to fluctuations in the prevalence of post-retirement employment are presented in Panel B of Table 4. For women, each of the shifting associations tended to depress the likelihood of labor force reentry. Given the 1977 estimates for family income, retirement income, and retirement tenure, the average estimates for all other covariates and the average population composition for the 33-year period, we estimate that the probability of the retirement-to-work transition for women would have been 0.019, i.e., about 2 percent of female retirees would be expected to return to employment. The corresponding estimate for men is 0.033, i.e., over 3 percent of male retirees would return to employment. But when we allow the estimated effects of family income, retirement income, and retirement tenure to shift to their estimated 2009 values, the predicted probability declines to 0.013 for women and 0.019 for men. For women, the downward pressure on post-retirement employment is clearly driven by changes in the influence of retirement tenure: we estimate that the increasing negative association between retirement tenure and post-retirement reemployment depressed the probability of labor force reentry by about 51 percent. For men, the declining influence of family income and the increasing negative influence of retirement tenure contribute a similar magnitude of negative pressure on the likelihood of post-retirement reemployment. In contrast, the declining negative influence of retirement income added a countervailing upward pressure on the likelihood of reemployment among male retirees.

## Conclusion

Taken together, the results from the descriptive, multivariate and the decomposition analyses support a number of conclusions regarding post-retirement employment. First, in the aggregate, the trends in post-retirement employment have not changed much over the past 33 years. We find that the probability of labor force reentry among women has followed a curvilinear trend with a slight U-shape over the time period, and the trend line for the likelihood of post-retirement employment for men is linear and slightly positive. For both genders, the trends for full-time employment among reemployed retirees are flat during the first third to half of the time period and then turn significantly upward. In our multivariate models, which include controls for the full set of demographic and macroeconomic variables, the trends in post-retirement reemployment remain significant: the curvilinear shape of the trend for women is robust and a curvilinear trend for men is revealed. The trends in post-retirement reemployment are therefore not explained by the demographic and macroeconomic variables we include in our analysis. In contrast, the estimated coefficients for YEAR and $YEAR^2$ become insignificant in the full multivariate model. This finding indicates that these trends are explained by the covariates we examine.

Second, the modest trends in post-retirement employment that are observed for the full population obscure the countervailing influences of significant changes in behavior and in the macroeconomic forces and population composition that are significant determinants of post-retirement employment. Our decomposition analysis shows that the increasing educational attainment of the population acts as a strong pressure toward increasing rates of post-retirement employment, but that positive influence is countervailed by the combined downward pressure of other population dynamics and behavioral changes. In particular, the aging of the retiree population, longer retirement tenure, the enactment of the SCFWA, and the changing influence of family income all negatively influenced the overall probability of post-retirement employment.

We find that macroeconomic forces, such as policy changes, economic recessions, fluctuations in unemployment, and the changing occupational structure, are significant determinants of the employment transitions retirees make. Many of those macroeconomic forces operate in ways that contradict our expectations. For example, the negative association between the SCFWA and post-retirement labor market reentry appears contradictory to the intent of that policy. Our analysis cannot identify the mechanisms that might drive this association. To do so will require richer data that allow for the identification of the complex ways that workers navigate retirement, employment, and the policy benefits available to them. Future research should examine age-differentiated effects of SCFWA on post-retirement employment, as the policy should only affect those of full retirement age.

This study adds to the growing literature on retirement-to-work behavior. We provide an analysis of the trends and correlates of post-retirement employment, using decomposition models to underscore the differing effects of changing behavior, macroeconomic forces, and population composition on the probability of post-retirement employment. Although this analysis is limited by the truncated time over which the CPS data allows us to observe post-retirement behavior, our results complement retirement research that focuses on organizational and individual behavior, and helps organizations and policy-makers understand the changing context under which retirement-to-work decisions are made.

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## Notes

1. Age discrimination may constrain employment opportunities for older workers. The prevalence of age discrimination is difficult to measure but may account for a significant percentage of ‘discouraged’ older workers. Johnson and Mommaerts (2011) suggest that ‘employers are reluctant to hire workers age 50 and older’ based on preconceived ideas about older workers (ix). Johnson and Neumark (1997) also find that self-reported age discrimination is associated with a decrease in men’s labor force participation.
2. See the ‘Normal Retirement Ages’ chart on the Social Security Administration website at http://www.ssa.gov/oact/progdata/nra.html, which shows that the ‘Normal Retirement Age,’ or the age that someone is eligible for full Social Security benefits, is 65 for those born before

1938 and gradually increases to age 67 for those born in 1960 and later. Early eligibility for permanently reduced benefits begins at age 62.

3. We exclude merges that do not meet the '$S|R|A$' criteria of Madrian and Lefgren (2000); that is, they are invalid because they are unlikely to be the same person at times $t$ and $t$+1, based on discrepancies in sex, race, or age.
4. We acknowledge that this operationalization conflates labor force entry with employment among those in the labor force. It also makes ambiguous the status of those retirees who reenter the labor force but are unemployed at $t$+1. As there are few retirees who fall into this category (1170 from the combined sample of 33 years), treating labor force entry and employment as distinct transitions is empirically redundant.
5. State-level unemployment rates are available from the LAU for the full time series of our analysis, but unemployment rates for metropolitan areas are available only since 1984; therefore, we use the state-level unemployment rates as the measure of this 'local labor market' characteristic for all individuals prior to 1984. We averaged the seasonally adjusted monthly rates to produce annual unemployment rates for each geographic area.
6. See the National Bureau of Economic Research (NBER) website at http://www.nber.org/cycles.html. NBER identifies the month and year in which recessions start and end, but we are not able to use the month information as our data are collected yearly and the CPS questions refer to experiences within a yearly period. We therefore identify recessionary periods using only start and end years.
7. The CPS variable FNUMPER, number of persons in the family, is used to adjust the family income by family size. We use the Consumer Price Index series CUUR0000SA0 to normalize the income measures to 2009 dollars.
8. These measures are available only in recent years of the CPS: the self-report of health condition (CPS variable is HEALTH) is available starting in 1995; the insurance indicator (CPS variable is HVHI) is available starting in 1980. Our models include an indicator of missing data that is coded 1 for all years for which these data are unavailable.
9. We derive this indicator from the 'reason not working last year' variable (CPS variable RNOWRK): RETENURE is coded 1 for individuals who reported 'retired' as the reason they did not work in the year prior to $t$.
10. Detailed statistics are available from the authors.
11. We also tested for polynomial trends using a series of piecewise linear models that specify the trend as having two or three distinct segments characterized by different slopes and inflection points. None of the piecewise regression specifications fits the data better than the curvilinear specification for either the male or female data.
12. In the presence of large sample sizes, the BIC provides a conservative goodness-of-fit test of alternative model specifications. Lesser values of BIC indicate relatively better-fitting models.

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